

Open Post-doctoral Position Auditory Cognitive Neuroscience

**We are seeking a creative, energetic postdoctoral
auditory cognitive neuroscientist to join our research team**

The position will be supported by a new NIH-supported research project, *Flexible representation of speech in the supratemporal plane*, that weds the joint expertise of Drs. Lori Holt (Carnegie Mellon University) and Dr. Taylor Abel (Pediatric Neurosurgery, University of Pittsburgh) to advance how dynamic, flexible aspects of the mapping of speech input to phonemes are represented in the intracerebral response of human cortex.

A simple utterance like *beach* is distinguished from its near-neighbor *peach* by as many as 16 acoustic input dimensions. The details of how these dimensions are expressed varies as a function of whether *beach* is part of a story told by John or Mary, whether the talker speaks British or American English, and even whether the storytelling venue is quiet or noisy. Research directed at understanding speech comprehension has long grappled with how complex acoustic input relates to native-language representations for phonemes, the linguistically distinct units of sound that differentiate meaning like the [b] and [p] in *beach* versus *peach*. Intracranial neurosurgical techniques have rapidly advanced understanding of human cortical response to speech. There is now robust evidence that superior temporal gyrus (STG) plays a crucial role in extracting meaningful linguistic features from speech input, with consonant and vowel acoustic-phonetic dimensions apparent in the tuning of neural populations. This success can give the impression, at least implicitly, of a stable mapping from acoustic input dimensions to native-language speech representations, much like had been the starting point of traditional theoretical accounts. However, a rich behavioral research literature now demonstrates that the mapping of acoustic input dimensions to speech representations varies substantially across listeners and is malleable according to listening context. This *adaptive plasticity* – the dynamic, flexible mapping of speech acoustics to perception – is not yet well integrated into models of cortical speech processing. Our goal is to advance understanding in this domain.

The research will capitalize on human intracerebral recording through Dr. Abel's neurosurgical placement of stereoencephalographic (sEEG) electrodes in adolescent and young adult brains across the supratemporal plane. The successful postdoctoral candidate will assist with bringing well-tested behavioral paradigms into the surgical monitoring unit and align sEEG recordings with scalp EEG measurements that will build an informative link across the measurements possible with typical listeners, and listeners undergoing neurosurgery. She or he will spearhead the analyses of sEEG recordings and communicate the results. The program of research will involve simultaneous noninvasive scalp EEG, intracranial sEEG, and behavior will establish the perceptual weights with which acoustic dimensions map to speech representations, and how these mappings are adjusted flexibly according to short term speech input regularities.

The candidate will join a growing and highly interactive Pittsburgh Cognitive Auditory Neuroscience (PCAN) collective committed to understanding human auditory behavior and its psychological and biological bases. Together, Carnegie Mellon University and University of Pittsburgh boast research strengths in human, nonhuman animal, and clinical approaches to understanding auditory behavior. The successful candidate will be welcomed into a thriving, interdisciplinary intellectual community. Researchers in this highly supportive environment seek to span disciplines and employ multiple methodologies in their research. Drs. Holt and Abel provide close inter-laboratory collaboration, with many opportunities for professional development.

Pittsburgh, home to Carnegie Mellon University, is consistently rated among the most livable cities in America. With low cost-of-living, a thriving restaurant scene, a wealth of outdoor activities, and an accessible cultural district, there are ample opportunities to cultivate good work-life balance while advancing your scientific goals.

Qualifications:

- A PhD in neuroscience, psychology, engineering, or related
- One or more years of expertise in auditory cognitive (neuro)science; prior experience with human electrophysiology and psychophysics is highly desirable
- Broad experience with neuroscience or psychology literature; previous expertise with auditory cognitive neuroscience is advantageous
- One or more years of experience with coding, data analysis, or computational modeling
- Fundamental curiosity about how the brain coordinates auditory behavior, and a willingness to engage in collaborative research
- Statistical and programming skills (e.g., Matlab, Python, R)
- Enjoyment of working with and teaching others; willingness to play a role in mentoring more junior researchers in the group
- Fluency in speaking and writing in English
- Demonstrated ability to write results for publication in the scientific literature
- Flexibility, ability to learn quickly
- The ability to work independently as well as part of a scientific team are very welcome.
- While previous experience is not necessary, comfort working in a clinical environment is necessary.

Compensation will be aligned to the National Institutes of Health salary pay scale, according to experience. The initial appointment will be one year, with further funding possible for additional years upon satisfactory performance.

**We believe that equity and diversity make for better science.
We especially encourage candidates from diverse backgrounds to apply.**

Please apply with a cover letter expressing your research expertise, qualifications, interests, and research/career goals. You may direct questions and/or applications to Professor Lori Holt (loriholt@cmu.edu) or Dr. Taylor Abel (abeltj@upmc.edu). The position is open immediately and candidates will be sought until the position is filled. To apply, please also a CV, a statement of research expertise and interests, and the names of at least two references in an email to loriholt@cmu.edu and abeltj@upmc.edu.

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